



Troubleshooting Checklist

Based on the book *Troubleshooting with Wireshark*

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About this Troubleshooting Checklist

I have a basic troubleshooting checklist (albeit in my head) that I run through each time I open a trace file. The order in which I go through the checklist may change depending on the troubleshooting issue (UDP-based application troubleshooting vs. TCP-based application troubleshooting, for example).

Consider expanding this checklist to suit your needs.

This Troubleshooting Checklist was created as a supplement for the book *Troubleshooting with Wireshark* (Copyright 2014; hardcopy ISBN: 9781893939974).

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Let's get started...

Troubleshooting Checklist Sections

- Verify Trace File Integrity and Basic Communications
- Focus on Complaining User's Traffic
- Detect and Prioritize Delays
- Look for Throughput Issues
- Check Miscellaneous Traffic Characteristics
- TCP-Based Application: Determine TCP Connection Issues/Capabilities
- TCP-Based Application: Identify TCP Issues
- UDP-Based Application: Identify Communication Issues
- Spot Application Errors

Verify Trace File Integrity and Basic Communications

- Look for ACKed Unseen Segment (`tcp.analysis.ack_lost_segment` filter)
[Switch oversubscribed?] See *ACKed Unseen Segment* starting on page 191 of *Troubleshooting with Wireshark, 1st Edition*.
- Verify traffic from the complaining user's machine is visible. If not...
 - o Ensure the host is running.
 - o Test the host's connectivity (Can it communicate with another host?).
 - o Recheck capture location and process.
 - o Consider a resolution problem. See *Chapter 4: Resolution Problems* starting on page 91 of *Troubleshooting with Wireshark, 1st Edition*.
- Verify resolution process completion
 - o DNS queries/successful responses (consider cache use). See *Detect DNS Errors* starting on page 237 of *Troubleshooting with Wireshark, 1st Edition*.
 - o ARP requests/responses (consider cache use). See *MAC Address Resolution – Local Target* and *MAC Address Resolution – Remote Target* on page 97 of *Troubleshooting with Wireshark, 1st Edition*.

Notes

Focus on Complaining User’s Traffic

- Filter **on** related traffic (such as `tcp.port==80 && ip.addr==10.2.2.2`). See *Filter on a Host, Subnet or Conversation, Filter on an Applications Based on Port Number, Filter on Field Existence or Field Value* starting on page 42 of *Troubleshooting with Wireshark, 1st Edition*.
- Filter **out** unrelated traffic (such as `!ip.addr==239.0.0.0/8` or perhaps `!bootp`). See *Filter OUT Normal Traffic* starting on page 51 of *Troubleshooting with Wireshark, 1st Edition*.
- Export related traffic to a separate trace file (**File | Export Specified Packets**). See *Wireshark Lab 4: Extract and Save a Single Conversation* on page 91 of *Troubleshooting with Wireshark, 1st Edition*.

Notes

Detect and Prioritize Delays

- Sort and identify high delta times (**Edit | Preferences | Columns | Add | Delta time displayed**). See *Add/Sort a Delta Displayed Time Column* on page 116 of *Troubleshooting with Wireshark, 1st Edition*.
- Sort and identify high TCP delta times (**tcp.time_delta** column). See *Wireshark Lab 29: Add/Sort a TCP Delta Time Column* starting on page 123 of *Troubleshooting with Wireshark, 1st Edition*.
 - If Expert Infos items are seen, examine the Errors, Warnings and Notes listings. See *Chapter 6: Identify Problems Using Wireshark’s Expert* starting on page 151 of *Troubleshooting with Wireshark, 1st Edition*.
 - Consider “acceptable delays” (such as delays before TCP FIN or RST packets). See *Do Not Focus on “Normal” or Acceptable Delays* starting on page 107 of *Troubleshooting with Wireshark, 1st Edition*.
- Measure path latency (Round Trip Time) using delta times in TCP handshake. See *Wireshark Lab 31: Obtain the Round Trip Time (RTT) Using the TCP Handshake* starting on page 128 of *Troubleshooting with Wireshark, 1st Edition*.
 - Capturing at client: measure delta from TCP SYN to SYN/ACK - see *Filter for SYN and SYN/ACK Packets (Packets 1 and 2 of the TCP Handshake)* starting on page 129 of *Troubleshooting with Wireshark, 1st Edition*.
 - Capturing at server: measure delta from SYN/ACK to ACK - see *Filter for SYN/ACK and ACK Packets (Packets 2 and 3 of the TCP Handshake)* starting on page 130 of *Troubleshooting with Wireshark, 1st Edition*.
 - Capturing in the infrastructure: measure delta from SYN to ACK¹ - see *Filter for SYN and ACK Packets (Packets 1 and 3 of the TCP Handshake)* starting on page 130 of *Troubleshooting with Wireshark, 1st Edition*.
- Measure server response time
 - TCP-based application: measure from ACK to response, not request to ACK. See *Identify High HTTP Response Time* and *Identify High SMB Response Time* starting on page 139 of *Troubleshooting with Wireshark, 1st Edition*.
 - Use Wireshark’s response time function if possible (such as **dns.time**, **smb.time**, and **http.time**). See *Identify High DNS Response Time*, *Identify High HTTP Response Time*, and *Identify High SMB Response Time* starting on page 135 of *Troubleshooting with Wireshark, 1st Edition*.
- Measure client latency
 - How long did it take for the client to make the next request?
 - Consider “acceptable delays” (such as a delay before an HTTP GET). See *Do Not Focus on “Normal” or Acceptable Delays* starting on page 107 of *Troubleshooting with Wireshark, 1st Edition*.

Notes

¹ This trick was brought up by Jasper Bongertz at the Sharkfest conference.

Look for Throughput Issues

- Build the Golden Graph (IO Graph with “Bad TCP” on Graph 2). See *Correlate Drops in Throughput with TCP Problems (the “Golden Graph”)* starting on page 280 of *Troubleshooting with Wireshark, 1st Edition*.
- Click on low throughput points to jump to problem spots in the trace file.
- Look at traffic characteristics at low throughput points.
- Consider using an Advanced IO Graph to detect delays (such as `tcp.time_delta`). See *Chapter 10: Graph Time Delays* starting on page 283 of *Troubleshooting with Wireshark, 1st Edition*.

Notes

Check Miscellaneous Traffic Characteristics

- Check packet sizes during file transfer (Length column). See *Detect Consistently Low Throughput due to Low Packet Sizes* starting on page 275 of *Troubleshooting with Wireshark, 1st Edition*.
- Check IP DSCP for prioritization.
- Check 802.11 Retry bit setting (**wlan.fc.retry == 1**). See *Wireshark Lab 98: Filter on WLAN Retries and Examine Signal Strength* starting on page 326 of *Troubleshooting with Wireshark, 1st Edition*.
- Check for ICMP messages.
- Check for IP fragmentation.

Notes

TCP-Based Application: Determine TCP Connection Issues/Capabilities

- Look for unsuccessful TCP handshakes.
 - SYN, no answer (See *Wireshark Lab 20: No Response to TCP Connection Request* starting on page 101 of *Troubleshooting with Wireshark, 1st Edition.*)
 - SYN, RST/ACK
- Examine the TCP handshake Options area.
 - Check MSS values.
 - Check for Window Scaling and Scale Factor. (See *Lab 9: Create a Button to Detect Missing TCP Functionality* starting on page 53 of *Troubleshooting with Wireshark, 1st Edition.*)
 - Check for Selective ACK (SACK). (See *Lab 52: Determine if Selective ACK (SACK) is in Use* starting on page 172 of *Troubleshooting with Wireshark, 1st Edition.*)
 - Check for TCP Timestamps (especially on high-speed links).

Notes

TCP-Based Application: Identify TCP Issues

- Launch the Expert Infos window. See *Chapter 6: Identify Problems Using Wireshark's Expert* starting on page 151 of *Troubleshooting with Wireshark, 1st Edition*.
 - Consider number of errors, warnings and notes
 - Consider impact of each item
- Check the Calculated window size field values (**tcp.window_size**). See *Lab 7: Filter on the Calculated Window Size Field to Locate Buffer Problems* starting on page 48 of *Troubleshooting with Wireshark, 1st Edition*.
- Examine unexpected TCP RSTs.

Notes

UDP-Based Application: Identify Communication Issues

- Look for unsuccessful requests.
 - o Request, no answer
- Look for repeated requests.

Notes

Spot Application Errors

- Filter for application error response codes (such as `sip.Status-Code >= 400`).
See *Chapter 7: Identify Application Errors*, starting on page 235 of *Troubleshooting with Wireshark, 1st Edition*.

Notes
